

JAN 28 2008

PATENT APPLN. NO. 10/743,745  
RESPONSE UNDER 37 C.F.R. §1.111

PATENT  
NON-FINAL

REMARKS

In the present action, claim 1 is rejected under 35 U.S.C. § 102(b) as being anticipated by Kaneko (U.S. Patent No. 5,964,968). Claims 1 to 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneko alone or in combination with Chartouni et al., "The influence of cobalt on electrochemical cycling stability of LaNi<sub>5</sub>-based hydride forming alloys", 21 March 1996, Journal of Alloys and Compounds ("Chartouni") or Newman et al., U.S. Patent No. 5,283,139 ("Newman").

Claims 1 and 13 have been amended to recite that the hydrogen absorbing alloy is represented by the formula "Ln<sub>1-x</sub>Mg<sub>x</sub>Ni<sub>y-a-b</sub>Al<sub>a</sub>M<sub>b</sub> (where Ln is at least one element selected from rare earth elements, M is at least one element selected from V, Nb, Ta, Cr, Mo, Mn, Fe, Co, Ga, Zn, Sn, In, Cu, Si, P and B, 0.05 ≤ x < 0.20, 2.8 ≤ y < 3.9, 0.10 ≤ a ≤ 0.25, and 0 ≤ b)". This amendment is supported by claims 5 and 17 and the description in paragraph [0019] of the specification of the present application. Claims 5 to 8 and 17 to 20 have been canceled.

The amendment to claim 1 overcomes the 35 U.S.C. 102(b) rejection. As amended, claim 1 includes the limitations of claim 5, which is not included in the 35 U.S.C. § 102 rejection.

Applicants respectfully submit that the alloy of Kaneko is different and distinct from the alloy of the present invention and that Kaneko, alone or in combination with Chartouni or Newman, cannot be properly modified within the meaning of 35 U.S.C. § 103(a) to obtain the alloy of the present invention.

In the response filed June 28, 2007, to the Final Action of March 28, 2007, applicants argued that the alloy of the present invention is a rare-earth-Mg-Ni alloy having a crystalline structure of the  $AB_3$ , or the  $AB_{3.5}(Ce_2Ni_7)$  type, which alloy is different from alloys of the  $AB_2$  and  $AB_5$  type crystalline structure. (Refer to paragraphs [0004] ~ [0007] of the present application in which "CaCu<sub>5</sub> type" (line 3, paragraph [0004]) has the same meaning as  $AB_5$ ). The alloy of Kaneko, on the other hand, is an  $AB_5$  single-phase crystal (LaNi<sub>5</sub> single-phase crystal).

More particularly, the alloy of the present invention can be represented by the formula  $AB_{x'}$ , where  $x'$  is 2.8 ~ 3.9, A is  $Ln_{1-x}Mg_x$ , and B is  $Ni_{y-a-b}Al_aM_b$ , because the total mole ratio of Ln and Mg in the formula  $Ln_{1-x}Mg_xNi_{y-a-b}Al_aM_b$ , i.e., "1-x" and "x", is 1, and the total mole ratio of Ni, Al and M in the formula  $Ln_{1-x}Mg_xNi_{y-a-b}Al_aM_b$ , i.e., "y-a-b", "a" and "b", is 2.8 to 3.9. For example, the total mole ratio of Ni, Al and M in Example 10 is 3.43 (i.e., the mole ratio of Ni ("y-a-b") is 3.1, the mole ratio of Al ("a") is 0.2,

the mole ratio of Co and Fe ("b") is 0.1 plus 0.03, and the total mole ratio is 3.43.)

The alloy in Kaneko can also be represented by the formula  $AB_x$ , but  $x'$  is  $4.5 \sim 5.0$ , A is  $R_{1-x}L_x$ , and B is  $Ni_{1-y}M_y$ . This is admitted in the statement of the 35 U.S.C. § 103(a) rejection where the alloy of Kaneko is described as having the form " $(R_{1-x}L_x)(Ni_{1-y}M_y)_z$ ", where z is 4.5 to 5.0. (Action, page 3, lines 1-6 from the bottom of the page). Therefore, the alloy is completely different from that of the present invention.

In the present invention in which the alloy is a rare-earth-Mg-Ni alloy having a crystalline structure of the  $AB_3$  or  $AB_{3.5}$  ( $Ce_2Ni_7$ ) type and in which the composition is optimized to one having the formula  $Ln_{1-x}Mg_xNi_{y-a-b}Al_aM_b$  (where Ln is at least one element selected from rare earth elements, M is at least one element selected from V, Nb, Ta, Cr, Mo, Mn, Fe, Co, Ga, Zn, Sn, In, Cu, Si, P and B,  $0.05 \leq x \leq 0.20$ ,  $2.8 \leq y \leq 3.9$ ,  $0.10 \leq a \leq 0.25$ , and  $0 \leq b$ ), high capacity and improved cycle characteristics are obtained. The properties of the alloy of the present invention cannot be expected from the disclosure of Kaneko in which the kind of alloy and crystalline structure are different.

Kaneko, moreover, teaches away from an alloy as claimed in the present invention and represented by the formula  $AB_{x'}$ , where  $x'$  is 2.8 ~ 3.9. Kaneko describes in Col. 4, lines 58 ~ 61:

"If  $z$  in the above formula (1), i.e., the atomic ratio of  $(Ni_{1-y}M_y)$  is less than 4.5 when  $(R_{1-x}L_x)$  is 1, the  $LaNi_5$  type single phase structure is not obtained, and the battery life is shortened."

In the face of this teaching, a person of ordinary skill in the art would not have been motivated to modify the alloy of Kaneko, in view of the teachings of Chartouni and Newman, as required to obtain the alloy of the present invention.

In the "Response to Arguments" on page 9 of the present Action the Office states that applicants rely on the crystalline structure of the alloy of the present invention, i.e., a  $AB_3$  or  $AB_{3.5}$  type structure, to distinguish over the alloys of Kaneko, but that such feature is not recited in the claims. However, as explained in the response to the Final Action and as explained above, the alloy of the present invention can be represented by the formula  $AB_{x'}$ , where  $x'$  is 2.8 ~ 3.9, i.e.,  $x'$  is a maximum of 3.9, A is  $Ln_{1-x}Mg_x$ , and B is  $Ni_{y-x}Al_xM_b$  (amended claim 1), or B is  $Ni_{y-x}Al_x$  (claim 1 prior to the amendment).

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For the above reasons, removal of the 35 U.S.C. 102(b) and 35 U.S.C. 103(a) rejections of the claims is in order and is respectfully requested.

Claims 1, 5-8, 13, and 17-20 are rejected on the ground of nonstatutory obviousness-type double patenting ("ODP") over claims 1-2, 7-8, 13-14 and 17-18 of copending Application No. 11/041,678. Without admitting the propriety of the rejection, a terminal disclaimer is being submitted herewith in order to overcome the ODP rejection.

The foregoing is believed to be a complete and proper response to the Office Action dated September 27, 2007.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension and any additional fees that may be required may be charged to Deposit Account No. 111833.

Respectfully submitted,  
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